



## FOSSIL ENERGY RESEARCH BENEFITS

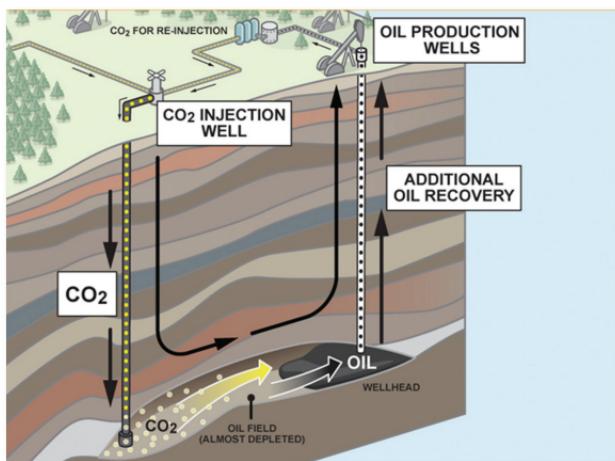
### Enhanced Oil Recovery

**Enhanced Oil Recovery (EOR)** is a way to squeeze out additional, hard-to-recover barrels of oil remaining in older fields following conventional production operations. It can also be used to permanently store carbon dioxide ( $\text{CO}_2$ ) underground.

*EOR helps increase domestic oil supplies while also providing a way to safely and permanently store  $\text{CO}_2$  underground.*

Thanks in part to innovations pioneered at the **Office of Fossil Energy's National Energy Technology Laboratory (NETL)**, the United States is a world leader in the number of EOR projects (193) and volume of oil production (some **663,000** barrels daily) from this method. This represents about **13 percent** of total U.S. production.

Although there are other methods (such as steam and chemical injection), 56 percent of U.S. EOR projects use  $\text{CO}_2$  or other gas injection for producing “stranded,” or hard-to-recover oil. EOR is a mature (40+ years) and proven technology for **increasing oil production** and **safely transporting and storing carbon dioxide** permanently in underground reservoirs.



*EOR is a way to recover additional domestic oil resources from older fields and permanently store carbon dioxide underground. (Illustration: Clean Air Task Force, available at: [http://www.coaltransition.org/pages/carbon\\_storage/30.php](http://www.coaltransition.org/pages/carbon_storage/30.php).)*



Launched in 2000, the **Weyburn-Midale CO<sub>2</sub> Project** in Saskatchewan, Canada, is the world's largest full-scale, in-field study of CO<sub>2</sub> injection and storage in depleted oil fields. When completed, the 11-year International Energy Agency project (funded in part by DOE) will permanently store 40 million metric tons of CO<sub>2</sub> while increasing oil production by 18,000 barrels per day.

### Facts About Enhanced Oil Recovery

- ✓ The U.S. Department of Energy (DOE) began funding CO<sub>2</sub> EOR research in the late 1970s.
- ✓ CO<sub>2</sub> injection for EOR daily produces over **270,000 barrels**, or about **5 percent** of total U.S. oil production.
- ✓ Over **48 million** metric tons (nearly 53 million short tons) of CO<sub>2</sub> are used yearly for EOR in the United States. Of this total, **25 percent** is produced by human activity, such as refining or manufacturing; the rest is from naturally occurring deposits.
- ✓ CO<sub>2</sub> injection has helped recover a total of about **1.5 billion barrels** of oil from mature U.S. fields.
- ✓ The U.S. Energy Information Administration projects wider use of EOR will result in the technology providing **33 percent** of total U.S. onshore production in **2035**.
- ✓ EOR benefits U.S. energy security by helping **reduce** the need for **oil imports**. It has great potential for environmental benefit as one means for **permanently storing CO<sub>2</sub> emissions** from power plants and industrial sources.

Sources: NETL; Oil & Gas Journal, April 19, 2010, pages 36-37.



U.S. Department of Energy  
OFFICE OF FOSSIL ENERGY

Last Updated: June 2011

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